**T05D06 – Bond Energy (James, is that you?)**

Name …………………………………………………………..

1. Acetone can be converted into isopropyl alcohol, rubbing alcohol, by the following process.

O O - H

H3C – C – CH3 (g) + H2 (g) 🡪 H3C- C – CH3

H

2. Hydrazine, N2H4, is used as a rocket fuel because it reacts very vigorously with oxygen to form nitrogen gas, and water vapor. Using bond energies calculate the heat of this reaction. [Must write the chemical equation first]

3. Hydrogen cyanide can be reduced with hydrogen to form amines. Using Lewis structures, and bond energies estimate the heat for this reaction (ΔHo reaction)

HCN (g) + H2 (g) 🡪 HCNH2

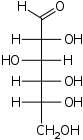
4. Use bond energies to estimate ΔH for each of the following. Each are skeletons and must be balanced.

1. The combustion of propane fuel:

C3H8 (g) + O2 (g) → CO2 (g) + H2O (g)

1. Fermentation of glucose (sugar, an aldose monodaccharide) in the absence of oxygen. This process is known as anaerobic respiration: (use the straight chain monomer seen at left, rather than the ring structure of glucose)

C6H12O6 (s) → CO2 (g) + C2H5OH (l)



5. Calculate the enthalpy change, ΔH, for the production of Freon-12 (one of my favorite global warming compounds) from the reaction of methane, chlorine, and fluorine. Skeleton equation given.

CH4 (g) + Cl2 (g) + F2 (g) → CF2Cl2 (g) + HF + HCl (g)

6Using bond energies calculate the following enthalpy change, ΔH. Skeleton equation. (BTW, O3 is ozone)

C2H4 (g) + O3 (g) → CH3CHO (g) + O2 (g)

Calculate the enthalpy change for the above using your data booklet or the shared packet handed out in class.

How do they compare?

Worksheet modified from Al Olsen, Towson High School, MD